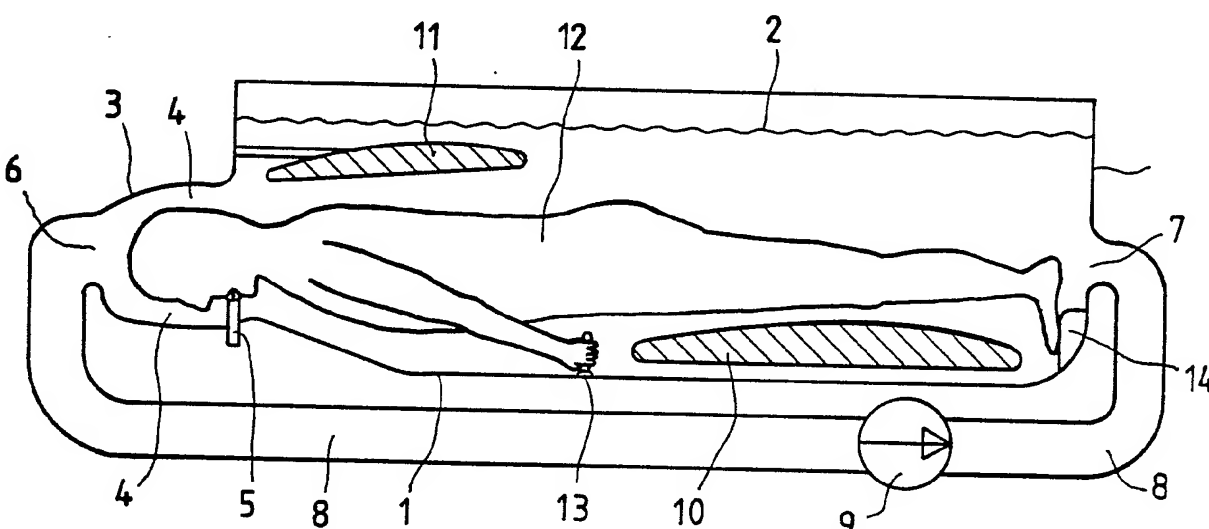




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<p>(54) Title: AN APPARATUS FOR REALISING MASSAGE</p>  <p>(57) Abstract</p> <p>An apparatus for realising massage by means of a fluid, preferably heated water, comprises a container (1) for water and a pump (9) for circulating the water. The apparatus further includes a conduit (8) with openings (6, 7) discharging into the container (1) for guiding the water flow in a direction which is counter to the direction of the force of gravity in relation to a part of the body (12) of a patient, when the patient is in the upright position. The container is of a form which is adapted to the configuration of the part of the body (12) in order to provide a substantially uniform flow about this part of the body. In one embodiment, the container may, at its head end, be provided with a tubular sleeve which partly extends into the container and which is disposed in spaced apart relationship beneath the free water surface (2). The sleeve is intended to accommodate at least a part of the head of the patient and is provided with a funnel-like transition to the outlet opening (6) from the container (1), such that a partial vacuum is created in the region of the crown of the patient.</p>		

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AN APPARATUS FOR REALISING MASSAGE.

TECHNICAL FIELD

The present invention relates to an apparatus for realising massage, the apparatus comprising a container for a fluid, preferably water, and drive means for establishing flow in the fluid, the body of the patient who is to be given the massage being preferably totally immersed in the fluid in the container.

BACKGROUND ART

Many different apparatuses are known in this Art for massage by means of a fluid. For example, use has been made of shower apparatuses in which the pressure of the discharging jet of shower water is pulsed in such a manner that a loading which varies in time is imparted to the section of the skin on which the shower jet impinges. Use has also been made, in shower arrangements of this type, of jets at different temperatures in order thereby to provide increased stimulation to the target skin areas.

Massage in water - or hydromassage as it is popularly known - has also been carried out such that that part of the body which is to be treated is immersed in the water and air at elevated pressure is blown into the water in the form of bubbles, these setting the water in motion and, under considerable expansion, rising towards the surface and thereby carrying out the massage operation proper.

The above-described massage may possibly be considered as being a general stimulant to the skin in that random force and random direction are imparted to the effects of the massage.

However, the above-described apparatuses are incapable of providing a massage which is targeted in relation to that part of the body which is to be subjected to the massage, for which reason, for example, such skin lesions or tissue changes as are wholly or partly dependant upon the force of gravity cannot be treated.

OBJECTS OF THE INVENTION

Thus, the object of the present invention is to realise an apparatus for massage which is designed so as to permit directed, or targeted massage. The invention has for its particular object to realise an apparatus which is capable of counteracting such cutaneous changes as are wholly or partly dependant upon the force of gravity on the skin or subjacent tissue portions.

SOLUTION

According to the present invention, the object as set forth above will be attained if the apparatus intimated by way of introduction is characterised by means for guiding the flow about the part of the body in one major direction which is counter to the direction of the force of gravity in relation to the part of the body, when the bearer is in the erect position.

One preferred embodiment of the present invention calls for the provision, on the drive means, of an inlet and an outlet for the fluid. This embodiment is suitably characterised in that the inlet and the outlet are disposed in the container in order to provide the essential and major direction of flow.

The subject matter of the present invention is further suitably characterised in that the container is of a configuration which is adapted to the configuration of the part of the body in order to provide substantially uniform flow about that part of the body. Furthermore, there may be provided, in the container, guide surfaces for guiding the flow, these guide surfaces optionally being adjustable.

Further advantages inherent in the present invention will be attained if the apparatus according to the present invention is given one or more of the characterising features as set forth in any one of appended claims 5 to 9.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The nature of the present invention and its aspects will be more readily understood from the following brief description of the accompanying Drawings, and discussion relating thereto.

5 In the accompanying Drawings:

Fig. 1 schematically illustrates one apparatus according to the present invention; and

Fig. 2 illustrates a modified embodiment of the apparatus according to the invention.

10 **DESCRIPTION OF PREFERRED EMBODIMENT**

Referring to the Drawings, Fig. 1 schematically illustrates, in somewhat simplified form, an apparatus for massage of the whole of the human body. The apparatus comprises a container 1 which is open at the top and is filled with water to the level 2. At its one short
15 end, the container 1 is provided with a bulge 3 which is dimensioned and, in its configuration, approximately adapted to the contours of the head of a patient, such that the patient's head may be moved into the bulge without coming into contact with its walls. Thus, a flow space 4 of at least a few centimetres should be formed between
20 the head of the patient and the inner surface of the bulge. It is important, in this context, that the discharge throat of the bulge 3 into the container 1 lie at a comfortable depth beneath the free surface of the water 2, such that no air from above the surface of the water is entrained into the flow space 4 because of the reduc-
25 tion of the static pressure (or increase of the dynamic pressure) of the water occasioned there by the flow rate.

Seen from above, the container is suitably at its widest in the region about the shoulders of the patient, to be subsequently of approximately uniform width, or slightly tapering width towards the
30 waist region of the patient. Below the waist region, i.e. along the legs of the patient, the container may suitably taper more sharply.

Viewed from the side, the container 1 may, along the legs of the patient, be of approximately constant depth and have a planar or slightly concave bottom. From the region slightly above the waist of
35 the patient, the bottom of the container suitably slopes slightly upwardly (along the thorax region of the patient) to connect with or merge into the bulge 3.

Furthermore, there is fixedly disposed, in the bottom wall of the bulge 3, a breathing tube 5 which leads through the wall of the container. The direction of the breathing tube 5 should be approximately vertical and its discharge be swan-necked so that condensation from exhaled air may depart. Further, there is provided, in the breathing tube 5, a valve which prevents the water in the container 1 from running out through the breathing tube. Opening of the valve may suitably be effected in that the patient bites about the mouthpiece of the breathing tube at its upper end.

10 The container 1 has an outlet 6 and an inlet 7 for water, these being interconnected, outside the container, by the intermediary of a conduit 8 where a pump 9 is provided. The pump drives the water through the conduit in a direction from left to right in Fig. 1 and in the opposite direction in the container 1, i.e. from
15 the foot end of the container towards its head end. Moreover, the pump is designed in such a manner as to provide a variable flow which may be set, possibly from the inside of the container by the patient undergoing treatment. The capacity of the pump is adapted in such a manner as at least to cater for the establishment of a linear
20 flow rate in the container 1 which is in excess of 0.5 m/s. However, the flow rate should suitably be maintained at a higher level so as to lie in the order of magnitude of between 1 and 3 m/s adjacent the surface of the body of the patient undergoing treatment.

According to the present invention, the vertical positioning of the inlet 7 in the container 1 is not critical, but is merely located so as to provide as uniform a distribution of flow as possible around the legs of the patient. Possibly, the opening at the inlet 7 may be of greater width than height so as to be elongate in its configuration.

30 On the other hand, the outlet 6 from the container 1 must be located so far beneath the free surface of the water 2 that any risk of entrainment of air into the conduit 8 and the pump 9 can be discounted.

The flow in a liquid may be both laminar and turbulent, a laminar flow "clinging" to the surfaces which define the flow, and considerable friction effect arising against these surfaces. In order to attain maximum effect on the patient, the flow in the container 1
35

should, as far as is possible, be laminar, so as thereby to avoid turbulent interface strata along the body of the patient, where these turbulent interface strata act as friction-damping layers, with the result that the laminar flow releases its hold on the
5 body. The risk of turbulence increases as the rate of flow increases, this thereby establishing an upper limit for suitable flow rate.

It is of particular importance that the flow about the crown of the patient be kept laminar as far as is possible. The reason for
10 this is twofold, namely: first that the large areal changes here often occur in the cross-sectional direction of the flow, with the result that the risk of turbulence is particularly great at this point, and, secondly that a laminar flow has proved to provide greater partial vacuum at the crown of the patient and thereby an
15 improved massage effect in this region. Hence, the massage effect is hereby wholly counter-directed to the effect of the force of gravity which normally acts on the crown and head of the patient.

In order also to maintain a uniform flow about the rest of the body and, as far as is possible, to ensure laminar flow condition,
20 the container 1 is, as has been intimated above, designed such that the space about the body to the defining walls of the container will be, if possible, of uniform thickness without sharp edges or abrupt surface area transitions. It is also possible to improve the flow pattern in the container by the employment of guide vanes 10 and 11
25 which may suitably be substitutable or at least adjustable. Apart from the two guide vanes 10 and 11 shown on the Drawing, it is, naturally, also possible to provide guide vanes which are vertically directed and which, thus, laterally guide the flow about the patient.

30 Since the density of the human body is very close to the value of 1, it may be assumed that the body 12 could, in principle, sway or float freely in the water in the container 1. Because of the flow forces, and also on such occasions when powerful inhalation has reduced the density of the body to less than 1, a positional correction and positional fixation may be required. For this reason,
35 there are provided, interiorly in the container 1, handles 13 and footrests 14 or recesses in which the patient may insert the toes.

Hereby, the patient may readily maintain a correct position in relation to the walls and breathing tube 5 of the container.

The apparatus illustrated in Fig. 1 functions such that the container 1 is filled with water at a suitable temperature, preferably in the range of between 30 and 40°C and particularly in the range of between 32 and 34°C. The upper guide vane 11 may suitably be swung wholly aside and the valve in the breathing tube 5 may be closed, possibly under the action of the water pressure in the container. Thereafter, the patient assumes the position in the container in the manner illustrated in Fig. 1 and bites on the breathing tube 5 so that the valve is thereby opened and a free breathing communication is established. The guide vanes 11 may be adjusted in place by an assistant or may possibly be manoeuvred from within the container by means of suitable operating devices. Once the patient is in the correct position, the pump 9 is started and its flow rate is set in such a manner that the intended massage effect is attained by means of the flow effected from the feet of the patient up towards the head. A suitable treatment time is in the range of between 15 and 45 minutes.

While a certain thermal loss may be expected from the water in the container 1, any extra supply of heat in continued operation will hardly be necessary, since the pump 9 imparts mechanical work and, to a certain extent, also heat to the flowing water.

In order to guarantee, primarily in public - but also in private - amenities, completely satisfactory water quality, there are suitably provided, between the outlet 6 and the inlet 7, filters, auxiliary water purification plants (with a sterilising, or at least anti-bacterial action) and possibly also a heating apparatus.

DESCRIPTION OF ALTERNATIVE EMBODIMENTS

Fig. 2 illustrates a smaller-scaled apparatus for carrying out the massage, this apparatus being conceived as an additional fixture which may be employed in a conventional bathtub. The apparatus comprises a pump unit 15 with a foot 16 which may suitably be of the so-called suction cup type, so that thereby the pump unit may be fixedly retained to the bottom of the bath.

A hood 17 is connected to the pump unit, the hood being designed so as to accommodate the head, shoulders and possibly the greater part of the thorax region of the patient who is to be given massage treatment. The hood 17 is provided with an opening 18 in its right-hand end in Fig. 2, this opening being intended to permit the inflow of the water located in the bath and flowing between the inner surface of the hood and the skin of the patient undergoing massage treatment.

The hood 17 is further provided with an inner portion 19 which is connected to the pump unit 15 and is in flow communication with the inlet of the pump disposed in the pump unit. In the inner portion 19 of the hood 17, there is further provided a breathing tube 5, this being of such a height that its upper end is located, with a generous margin, above the water level 2. Correspondingly to that described above, the breathing tube 5 is further provided with a suitably self-closing valve.

The apparatus illustrated in Fig. 2 functions in such a manner, when immersed beneath the water surface in a bath, as to realise water circulation from the bath into the opening 18 and around the upper part of the body and the head of the patient undergoing the massage treatment. From the inner portion 19 of the hood 17, the water flows into the pump and departs from the pump unit 15 by the intermediary of one or more outlets 20 so that the water is thereby re-introduced into the bath.

Naturally, in the embodiment of the present invention shown in Fig. 2, there are provided, between the inner portion 19 of the hood 17 and the pump unit 15, filters or similar screening devices which prevent the hair of the patient undergoing massage treatment from being sucked into the pump. Furthermore, this filter or screening device is, of course, designed in such a manner that the flow will, as far as is possible, be laminar and uniform in the hood 17.

A second modified embodiment of the present invention which is intended for treatment of the entire body of the patient is designed in such a manner that treatment is effected with the patient in the upstanding position. Suitably, the container 1 may, in this embodiment, be manufactured of transparent plastic and be provided with a door which sealingly closes the container - appropriately from the

inside. Consequently, when the door is open, the patient may easily enter and leave the container and, furthermore, it is easy to arrange the guide vanes, paddles or the like in a correct disposition, as may possibly be required to attain the optimum massage effect.

5 The outlet from the container is located in its upper regions and may possibly discharge freely above the surface of a buffer tank, while the inlet to the container (located at its bottom) is connected, via the pump, to a conduit which takes liquid from the bottom of the buffer tank. Hereby, the container will only be filled
10 with liquid once the pump has been started, for which reason the patient may easily enter and leave the container when it is empty.

In order to avoid, in the above-described, vertically operating embodiment, the risk of overly excess pressure in the container 1, a solution is conceivable in which the inlet of the pump 9 may, without communication with the buffer tank, be directly coupled to the
15 outlet 6 of the container 1 as soon as the container has been filled. Hereby, only the dynamic flow forces will act on the patient and the container and not the entire potential hydrostatic pressure of the pump, which would be the result if the outlet were to be
20 shut-off or blocked, even briefly.

Naturally, it is also possible to design the container in such a manner as to permit treatment when the patient is in the sedentary position, the pump arrangement being, of course, disposed in the manner described above such that this container is also empty when
25 the pump is not in operation.

In certain cases, further qualitative dimensions may be added to the massage if there are provided, in the inlet 7 of the container 1 - or at any other appropriate point in the interior of the container 1 - injector means for the aspiration of air under high
30 pressure in the form of bubbles, so that these bubbles accompany the flow into the container.

Of course, it must be ensured in this embodiment that the aspirated air may be separated off so as not to enter the pump and derange its function. Such a separation arrangement may easily be realised by causing the outlet 6 from the container to discharge into a
35 de-aerator in which the flow rate is held at such a low level that the air bubbles have time to depart up to the surface of the water

before the water is led further to the pump, and the air is discharged, possibly under pressure regulation, so that the water is maintained at a suitable level.

5 In one modification of the embodiment according to Fig. 1, a counterpart to the bulge 3 may be designed as a tubular portion or the like which extends at least partially in through the one short end wall of the container 1 and into the container. This tubular portion has a funnel-like, preferably 45° frusto-conical transition to the outlet 6 and is placed so far beneath the water level 2 that
10 the aspiration of air is avoided. A suitable depth may be approximately half of the diameter of the tubular portion.

The funnel-shaped transition to the outlet 6 entails a locally high flow rate, for which reason there is formed, in this region (in other words at the crown of the patient), a local increase of the
15 massage effect, primarily by a reduction of the water pressure in this region.

In order to accurately set and adapt massage of the crown of the patient, it is also possible to employ adjustably anchored abutments in the container, against which the shoulders of the patient
20 rest for accurate alignment of the head of the patient, and primarily the crown, in relation to the walls of the flow space 4, but above all in relation to the funnel-shaped transition to the outlet 6.

According to the present invention, the conduit 8 should be of
25 greater diameter or cross-sectional area in relation to the container 1 than that intimated on the Drawings, in order to render the flow as uniform as possible.

Finally, it is conceivable that the fluid in flow need not be pure water, but may be a mixture of water and various additives. It
30 would also be possible, according to the present invention - and primarily in those embodiments in which treatment of the patient is effected when the patient is in the sedentary or upstanding positions - to employ flowing air instead of water.

The present invention should not be considered as restricted to
35 that described above and shown on the Drawings, many modifications being conceivable without departing from the spirit and scope of the appended Claims.

CLAIMS

1. An apparatus for realising massage of a part of the body and comprising a container (1, 17) for fluid, and drive means (9, 15) for realising flow in the fluid, **characterised by** means (1, 6, 7, 10, 11) for guiding the flow about the part of the body (12) in one major direction which is counter to the direction of the force of gravity in relation to the part of the body when the bearer thereof is in the upstanding position.

2. The apparatus as claimed in claim 1, and in which said drive means (9, 15) are provided with an inlet (6) and an outlet (7) for the fluid, **characterised in that** said inlet and said outlet are placed in the container (1, 17) in order to provide the major direction of flow.

3. The apparatus as claimed in claim 1 or 2, **characterised in that** said container (1, 17) is of a form which is adapted to the configuration of the part of the body (12) in order to provide substantially uniform flow about the part of the body.

4. The apparatus as claimed in anyone of claims 1 to 3, **characterised in that** guide surfaces (10, 11) are disposed in said container (1, 17) for guiding the flow.

5. The apparatus as claimed in claim 4, **characterised in that** said guide surfaces (10, 11) are adjustable.

6. The apparatus as claimed in anyone of claims 1 to 5, **characterised in that** the container (1, 17) is provided, for the supply of breathing air, with a tube (5) which extends through the bottom thereof in a substantially vertical direction.

7. The apparatus as claimed in anyone of claims 1 to 6, **characterised in that** there are disposed, in the fluid, injector means for the supply of a second fluid in the form of bubbles or droplets.

8. The apparatus as claimed in anyone of claims 2 to 7, **characterised in that** the inlet (6) of said drive means (9, 15) has a funnel-shaped transition to the container.

9. The apparatus as claimed in anyone of claims 2 to 8, **characterised in that** there is provided, about the inlet (6) of said drive means (9, 15), a flow space (4) of lesser flow area than the remainder of the container (1).

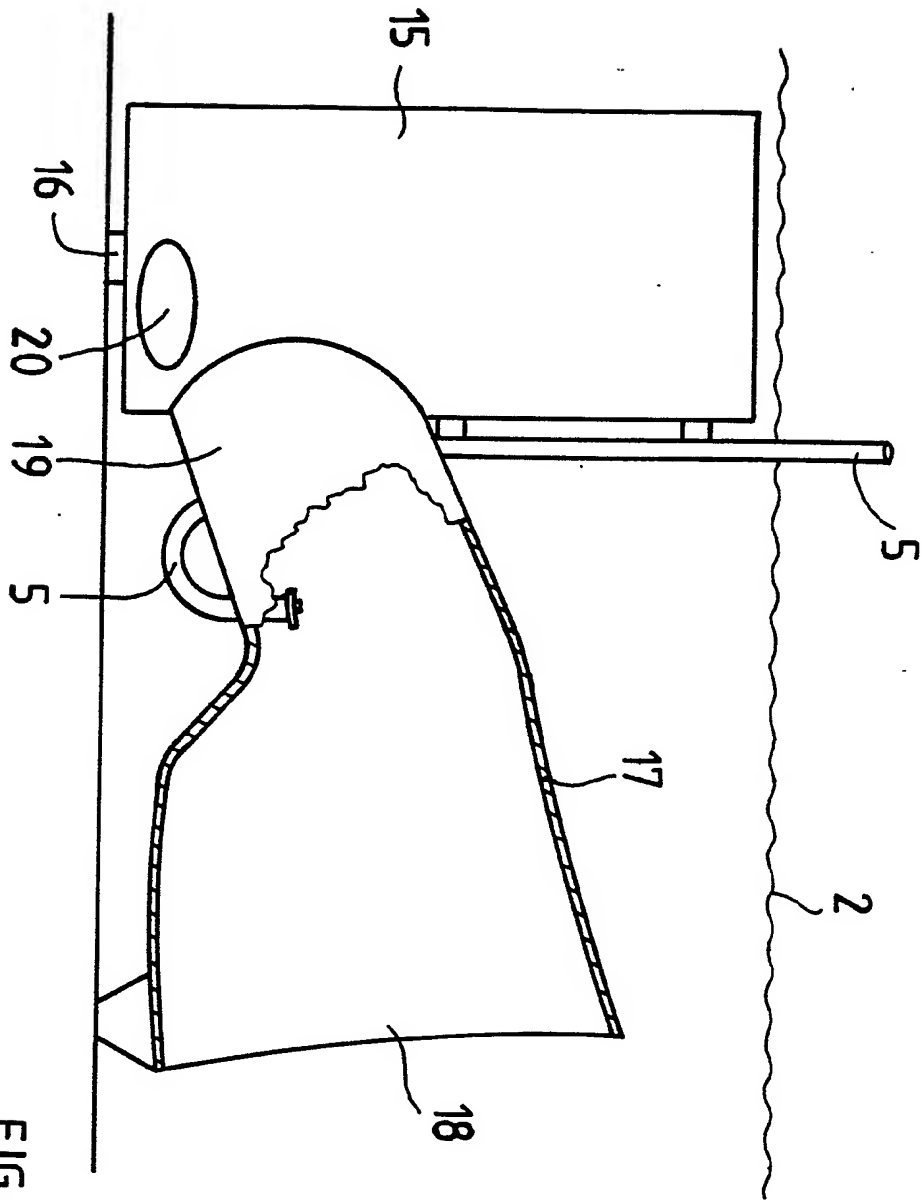


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE86/00424

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) * According to International Patent Classification (IPC) or to both National Classification and IPC 4 <div style="text-align: center; padding: 5px;">A 61 H 9/00</div>														
II. FIELDS SEARCHED <div style="text-align: center; padding: 5px;">Minimum Documentation Searched 7</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; padding: 5px;">Classification System</th> <th style="padding: 5px;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC 4 US C1</td> <td style="padding: 5px;">A 61 H 9/00, 33/00, /02, 37/00 <u>128</u>: 65, 66, 67</td> </tr> </table> <div style="text-align: center; padding: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8</div> <div style="text-align: center; padding: 10px;">SE, NO, DK, FI classes as above</div>			Classification System	Classification Symbols	IPC 4 US C1	A 61 H 9/00, 33/00, /02, 37/00 <u>128</u> : 65, 66, 67								
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III. DOCUMENTS CONSIDERED TO BE RELEVANT 9 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; padding: 5px;">Category *</th> <th style="padding: 5px;">Citation of Document, 11 with indication, where appropriate, of the relevant passages 12</th> <th style="width: 15%; padding: 5px;">Relevant to Claim No. 13</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 3 859 990 (PETER J SIMON) 14 January 1975 & CA, 994822</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1, 4, 5</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 3 520 296 (E T OATMAN ET AL) 14 July 1970</td> <td style="text-align: center; vertical-align: top; padding: 5px;">2</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 3 810 464 (WILLIAM SHEELER) 14 May 1974</td> <td style="text-align: center; vertical-align: top; padding: 5px;">7</td> </tr> </table>			Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13	X	US, A, 3 859 990 (PETER J SIMON) 14 January 1975 & CA, 994822	1, 4, 5	X	US, A, 3 520 296 (E T OATMAN ET AL) 14 July 1970	2	X	US, A, 3 810 464 (WILLIAM SHEELER) 14 May 1974	7
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>														
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center; padding: 5px;">1986-12-11</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center; padding: 5px;">1986 -12- 15</div> </td> </tr> <tr> <td style="padding: 5px;"> International Searching Authority <div style="text-align: center; padding: 5px;">Swedish Patent Office</div> </td> <td style="padding: 5px;"> Signature of Authorized Officer— <div style="text-align: center; padding: 5px;"> Dagmar Järvmán </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; padding: 5px;">1986-12-11</div>	Date of Mailing of this International Search Report <div style="text-align: center; padding: 5px;">1986 -12- 15</div>	International Searching Authority <div style="text-align: center; padding: 5px;">Swedish Patent Office</div>	Signature of Authorized Officer— <div style="text-align: center; padding: 5px;"> Dagmar Järvmán </div>								
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